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# MICROFOUNDATIONS OF MACROECONOMICS. POST-KEYNESIAN CONTRIBUTIONS ON THE THEORY OF THE FIRM

by *Rosaria Rita Canale*\*

## 1. Introduction

Looking through contributions about microeconomic theory, from classics to modern theory, it is possible to identify various attitudes on the role that firms play in the market. To simplify the existing multiplicity of opinion, two distinct positions can be recognized: 1) the first one considers the theory of the firm, its choices about price and production as ruled by consumer sovereignty, assuming that it is the eagerness to buy that drives the market. The entrepreneur's and consumer's interests converge thanks to automatic mechanisms leading to equilibrium. It is well-known that neoclassical economists can be ascribed to this trend of study. 2) the second position, on the other hand, considers the side of production as having a higher incidence in the identification of market equilibrium, as firms are able to set prices and co-ordinate demand behaviour. This turn-round in causality defines a market where the demand-supply relationship does not follow the rules of competitive-marginalist equilibrium, but alternative principles. The aim of this study is to analyse the contribution of Post-Keynesian scholars about this theme in the belief that the fundamental assumptions and conclusions they have drawn represent an alternative to the traditional theory, and are worth being considered carefully.

However, in the identification of the theoretical foundations of Post-Keynesian microeconomics theory, one can run into the difficulty of reducing to few unification principles the content of very different contributions, which often stand out for their critical positions vis-à-vis orthodox theory rather than for setting up the parts of a single alternative paradigm<sup>1</sup>.

Besides, Post-Keynesians have a strong taste for macroeconomics themes, rather than for microeconomics ones, since they believe that the macro aggregates determine the behaviour of small decision-making units. In fact, looking

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<sup>1</sup> The criticism of neoclassical theory of the firm goes back to Sraffa's contribution. Then, many scholars devoted themselves to the study of alternative theories on firm and industry stressing either the characteristic of managerial ability (Berle and Means 1932), or the institutional role of firms in the market (Galbraith 1963 and 1968), or the oligopolistic nature of the production of goods (Baran and Sweezy 1966; Rothchilds 1947).

at this literature, one can find a lot of contributions on this subject: the most reputed (Kalecki 1954, and, for an expansion of this, Asimakopulos 1975 and Cowling 1982) explain the formation of prices and produced quantities as the results of decision-making process of firms as a whole. These theories set themselves out as theories of investment decisions, profit accumulation, and the conflicting nature of income distribution. This point of view, however, is submitted to the criticism of those who argue that Post-Keynesian theory does not possess persuasive microeconomics bases and that, even though it can be maintained that in the process of aggregation the firms behave uniformly in influencing aggregate production and income distribution, it is always necessary to define the rules that allow each unit to take its production choices.

Most recently, some scholars have committed themselves to define the rules of such a decision-making process and to clarify the reasons why the interests between consumers and producers in the market do not converge. In so doing, they have tried to provide a microeconomic foundation to the distributive conflict identified at an aggregate level. These different contributions underline various dimensions of the undertaker's decision-making mechanism. However, I believe that they share some common elements, as they are characterized by a common global vision that brings about a persuasive alternative to the theoretical system of neoclassical microeconomics.

The aim of the present study is that of presenting the key elements of the Post-Keynesian global vision on the theory of the firm, and of explaining why price mechanisms prevail over quantity-determining mechanism.

The paper is articulated as follows: the second section contemplates the production function and the associated cost function in the belief that the assumptions of Post-Keynesians are the base of an alternative microeconomic theory. In the third section, then, I present the theory of price formation and of the shape of the supply curve. The fourth and final section draws some conclusions.

## **2. The foundation of microeconomics: production and cost functions**

The foundation of the Post-Keynesian microeconomic theory is provided by the shape of the production function.

As a matter of fact, Post-Keynesian economists believe that the law of decreasing marginal returns cannot be accepted since the organization of the modern production structure and the nature of technology cannot be described by the substitutability of factors of production. In fact, they maintain that:

1. it is impossible to draw a straightforward line between the contribution of capital and the contribution of work to production as, in the modern market economies, these two factors do not have an autonomous life<sup>2</sup>.

2. each capital incorporates a given technology and is conceived to be used in a peculiar way<sup>3</sup>.

From these *simple* propositions, which Post-Keynesians believe that can be drawn from observed facts, derive important results for the production function. In fact, once the above mentioned assumptions are accepted, it ensues that:

- a. it is impossible to single out the respective marginal productivity of every factor of production<sup>4</sup>;
- b. it cannot hold that product per worker is higher when the plant capacity is underused<sup>5</sup>.

In other words, one cannot use the production function to define the equilibrium level of employment and the requirements for firms' profit maximization<sup>6</sup>. Therefore, it remains an open question how the single firm chooses its plant dimension and the relative volumes of employment and production.

According to Post-Keynesian scholars, the firm equips itself with the capital amount, that, associated to a given number of workers, generates a product value that can satisfy the effectual demand and guarantee the programmed profit margin. In other words, the production function is *ex-ante* at fixed coefficients<sup>7</sup> and the dimension of plants is decided by expected demand. Further-

<sup>2</sup> Joan Robinson was the first to handle this problem, inaugurating the famous debate on capital theory. See Robinson (1953), (1956), (1967) and (1971). For an exhaustive study of this subject see Harcourt (1972).

<sup>3</sup> Cfr. Robinson and Eatwell (1973).

<sup>4</sup> In practice, it is not possible to isolate the effects of labour productivity deriving from capital accumulation from those coming from "technical progress" (or, to use the jargon of economists, the movement "along" the production function from those of the function itself). All that can be said is that the growth of productivity will be so much higher as technical change "activated by the new investment" grows. Cfr. Kaldor (1966).

<sup>5</sup> "In the traditional view, substitution between various inputs is always possible, both in the short and in the long run. In the short term, for instance, it is always possible to increase production, by having more labour working on the same machine, thus decreasing the capital/labour ratio and, therefore, the marginal physical product of labour", Lavoie (1992), p. 119.

<sup>6</sup> These features of the production function also exist in neoclassical theory, but they are limited to a peculiar case of the general condition of perfect substitutability. Therefore, the debate between these two schools of thought moves on to a different level, where the ability of the general case to represent the facts is compared. The question is then: Is there enough substitutability in an economic system to confirm the results of neoclassical theory? See Lavoie (1992).

<sup>7</sup> Firms, in deciding the technique of production to adopt at a certain time, instead of being confronted to a whole range of techniques among which to choose, can be constrained to a single

more, since in the short term a reduction of demand might occur, to which it is not possible to answer suddenly by modifying the dimension of plants, it is reasonable to think that machinery is on that occasion underused. As a consequence, returns are ex-post constant rather than marginally decreasing, since the machinery produces a constant output per hour of work associated to it<sup>8</sup>.

Assuming for simplicity sake a broad range of possible uses of plants – or, which is equivalent, infinite divisibility of capital – it is possible to define the production function in a continuous interval:

$$\begin{aligned} Y &= \pi N \text{ for every } N < N_{\max} \\ Y &= Y_{\max} \text{ for every } N > N_{\max}. \end{aligned}$$

Figure 1 explains this statement.

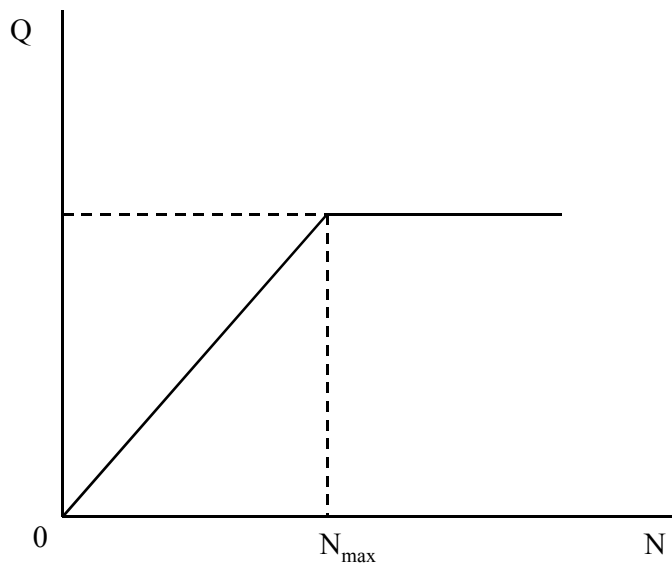


Figure 1

“best use” technique, that is to say, the production function ex-ante may be a “single point”. Cfr. Harcourt and Kenyon (1976) and Eichner (1976).

<sup>8</sup> “In our pattern the technique is such that, in all sectors, the output per worker remains constant until the existing capacity is completely used. When exceeding the point of full use of production capacity, the output cannot grow. Cfr. Robinson and Eatwell (1973).

The figure shows that, below maximum plant capacity it is always possible to increase the output by increasing the number of workers occupied, but above the co-ordinates ( $Y_{\max}$ ,  $N_{\max}$ ) this is no longer possible unless by varying the quantity of capital or changing the technique. The result is that above a certain amount of employment the marginal productivity will be null and the production function will lose its economic significance.

From the assumptions related to production derives the particular shape of the functions of average variable costs and of marginal costs, which, in Post-Keynesian analysis, do not follow the trends commonly reported in the most widespread handbooks<sup>9</sup>. What has been stated above clearly shows that the average cost and marginal cost curves maintain an unchanged trend as the output varies both in the short and in the long run. In fact, the variation of the ratio between the price of capital and the price of labour does not alter the choice of the quantity of output produced in the short and in the long run (the isoquant curves are angular) but only the height of the cost functions.

It is possible to chart what stated above. The average variable cost function – to make description realistic – can be assumed as decreasing until it achieves a certain degree of plant working efficiency; beyond this value it is constant until it reaches the capacity limit. Above this limit, the function will become very slanting, as a huge increase of costs is necessary to obtain a very small (if not null) growth of the output.

The marginal cost is similarly affected by the peculiar trend of total costs. After an increasing length, it becomes constant and takes the same value of average variable costs. When it goes over the maximum productive capacity it rises more than average variable costs. This is reported in figure 2, in which the dotted line describes marginal costs ( $C_{ma}$ ) and the solid line the average variable costs ( $CM_v$ )<sup>10</sup>.

According to these assumptions, there is not a single cost minimization condition ensuring the efficient use of resources, but a variety of “optimum” conditions, all identifiable in the horizontal part of the average and marginal costs curves.

The firms, therefore, could be in the position of underusing plants without necessarily waiving the profit margin from each product unit.

<sup>9</sup> The only microeconomics handbook containing alternative view is Koutsoyiannis (1979). For some reports see also Graziani (1985).

<sup>10</sup> This description can be found in Eichner and Kregel (1975), Eichner (1976), Koutsoyiannis (1979), Lavoie (1992), Arestis (1992).

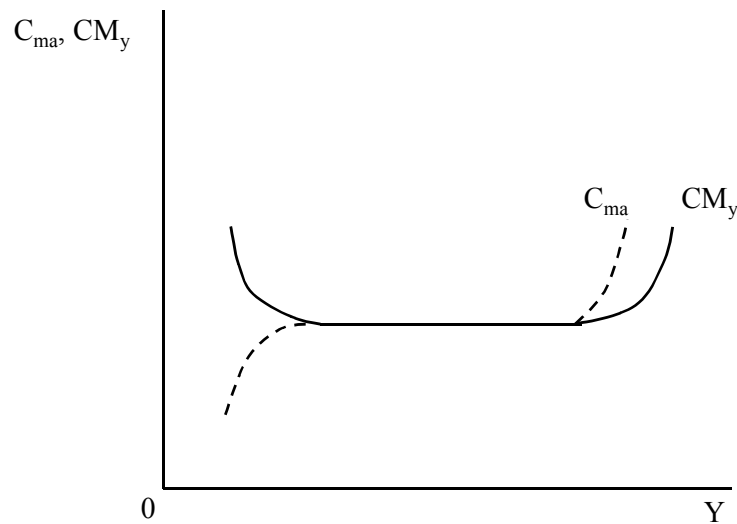


Figure 2

Overcapacity does not stem from an inefficient workings condition of the firm, but from the fact that the equipment is underused because of suddenly changes in demand, which the entrepreneur is not able to control. Possible reverse events – like a sudden increase of consumers' purchases – can induce the entrepreneur – at the moment of the initial decision – to oversize the plant giving rise to a steady condition of underutilization<sup>11</sup>.

### 3. The mechanism of pricing and the industry supply curve

Post-Keynesian scholars suppose that the market is not characterized by a stiff competition and that, for this, the firms are price-makers rather than price-takers. The firms do not consider the price as a given quantity determined by the market; instead, they fix the sale value on their own initiative, by adding a margin to prime costs. In this way, the price comes out from the so-called *mark-up* formula

<sup>11</sup> This argument is put forward by most scholars engaged on this subject. Koutsoyiannis has transferred it into an handbook arguing that firms establish the size of plants so to settle “somewhere between the two thirds and the three quarters of their global capacity”. Koutsoyiannis (1979), p. 118.

$$p = CM_v(1 + \gamma),$$

where  $\gamma$  is the profit margin.

This mechanism of pricing does not allow to embrace the traditional theory in the identification of prices and produced quantities. According to the orthodox approach, only the existence of non perfectly competitive markets – with a high level of demand compared to the size of supply – could be responsible for firms' extra profits. In any case, however, the maximization conditions are satisfied. Accordingly, the mark-up turns out to be a special case generated by market distortions, and the profit maximization condition that equalize revenue and marginal cost

$$(1) \quad R_{ma} = C_{ma}$$

is still satisfied.

In fact, because of the relationship between marginal revenue and the elasticity of demand curve ( $\eta$ ), it must be

$$(2) \quad R_{ma} = p(\eta - 1)/\eta$$

Taking account of (1) and (2) and of the assumption that marginal costs are constant and equivalent to average variable costs it must be:

$$p(\eta - 1)/\eta = C_{mv}$$

that is, the price must be equivalent to

$$p = [(\eta/\eta - 1)] C_{mv}$$

The analogy with the mark-up formula is evident. In fact, it is possible to identify a definite relationship between margin on costs and elasticity of demand:

$$(\eta/\eta - 1) = (1 + \gamma)$$

But, according to Post-Keynesian scholars this reasoning is weak from the beginning, as the equality in the margin of costs and revenue cannot suggest to firms the optimum quantity of production.

Pricing operation is dictated by the will to gain a margin of profit from each product unit. The causal relationship between produced quantities and prices



that can be found in orthodox theory is here inverted as the firms first establish the margin on costs and only after the size of the equipment, so to produce the quantity of goods demanded by the market at the price they have fixed<sup>12</sup>.

In other words – given the above assumptions about the production function – each firm's marginal revenue is represented by a horizontal line (with infinite elasticity) always lying above the average costs curve. Therefore, considering also the assumptions about the cost function, two circumstances may occur: a) if the margin is null, the firm's marginal revenue curve converges with the marginal cost function, and the optimum amount of quantity is indeterminate; b) if the margin is positive the marginal revenue meets the marginal cost in correspondence with the maximum plant capacity. This confirms that the firms are equipped with that quantity of capital that allows them to satisfy the market demand and to gain the programmed profit margin. In other words, the relationship of cause and effect goes from the price to the quantity and the same solution could be attained with different profit margins and different plant sizes.

<sup>12</sup> These considerations are confirmed by the circumstance that modern markets are characterized by an oligopolistic system in which each firm – once the global quantity of industry goods to put into the market has been fixed – sells on the basis of an agreement with the *leader*, without any possibility of changing it by itself. "The price that will be charged by the megacorp for its product during the current pricing period is determined by the industry as a whole acting through the price leader. Since the price charged by the industry as a whole during the current pricing period will be constant, whatever the rate of capacity utilization, the average revenue and the marginal revenue will also be constant. This gives the revenue curve the appearance of an infinitely elastic demand curve". Eichner (1976), pp. 43-4. This could be true also for a *price-leader* firm, because a change in prices could be responsible for the loss of *leadership*.

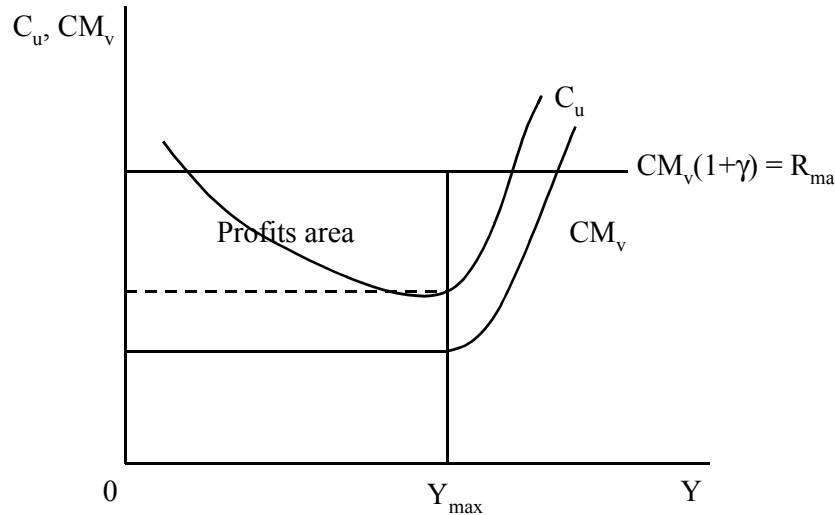


Figure 3

Figure 3 describes what stated above. The marginal revenue line ( $R_{ma}$ ) lies constantly above the variable average costs curve ( $CM_v$ ) (in the case not described of  $\gamma = 0$  it converges on it). The figure shows the firm's profit decision according to the assumptions above stated. The area included between the curve obtained adding to variable average costs a constant margin, that represents the above-described marginal revenue, and the unit costs curve ( $C_u$ ) represents the profits area, which comes out to be maximized in correspondence with the productive level matching the maximum utilization of equipment ( $Y_{max}$ )<sup>13</sup>.

This price mechanism suffers from a limit of uncertainty since the firm – given the downward-sloping industry demand curve – might decide to reduce the size of the plant and add a very high margin on costs to obtain the highest possible profit for each unit of product, or conversely it might cut the margin and increase the quantity of product<sup>14</sup>.

<sup>13</sup> This fact does not exclude that the firms decide not to utilize the full equipment capacity. In this case, as a matter of fact, they add to the goal of gaining a profit also a will to face a possible rise of demand. The conditions for price setting do not change, of course.

<sup>14</sup> "The crucial question then becomes: how do firms decide on the value of the margin of profit over direct cost or unit cost?", Lavoie (1992), p. 137.

Conceivable answers to this question are different and all seize some features of the pricing process. They underline different aspects of the *equilibrium* of the firm and offer altogether a persuasive answer to this question.

The prevailing solution considers the profit margin as tied to the goal to achieve a rate of growth of the firm's activity in the long term<sup>15</sup>, or better, tied to the need to raise money on the market for refinancing the firm in the following periods. The latter operation could represent an alternative to bank financing when the rate of interest is too high to be sustained<sup>16</sup>.

Moreover, the mark-up would be a historically determined value depending on the extent of the conflict over distribution and on the relationships of production in the market under examination<sup>17</sup>.

Further than that, there are – in the opinion of Post-Keynesian scholars – objective limits to the growth of prices, which amount to:

- a) a will to make entry barriers strong enough to restrict competition (if, for example, the price were too high, other firms could simply run into the sector, sell at a cheaper price, and subtract part of the market to existing firms; therefore, the higher is the *degree of monopoly*, the higher is the mark-up that firms may add, avoiding the coming of other firms into the market<sup>18</sup>;
- b) public intervention, which, in case of exorbitant prices, acts in order to make goods more accessible to the public.

In other words, the profit is an extra profit because it represents a goal *a priori* established by the firm. A larger competition can cut the mark-up and make the price equivalent to unit costs, although it is very unlikely that this circumstance may occur, as the selling value is set on the basis of the size of the sector's entry barriers.

Therefore, perfect competition reduces to be a peculiar case in the general conditions of the market functioning, and in no case, given the above assumptions about the production function, the rules of marginalist distribution can be applied to it.

From the assumptions described until now, it is possible to draw some conclusions about the form taken by the product supply curve of the whole industrial sector. The latter is described (see figure 4) by the curve of average variable costs raised with a mark-up. This curve is horizontal until it reaches the maxi-

<sup>15</sup> The best known models stating this theory are Eichner (1976), and Harcourt and Kenyon (1976).

<sup>16</sup> See Eichner (1980). This formulation represents the microeconomic basis of the determination of *mark-up* at a macroeconomic level elaborated by Weintraub (1973).

<sup>17</sup> Robinson (1942) and (1977). But the argument was accepted by Kaldor. See Kaldor (1985).

<sup>18</sup> See Kalecki (1938).

mum plant capacity, becoming very steep beyond this value consistently with the assumption that a higher degree of plant utilization cannot be attained or that the production does not increase significantly, although it rises costs in a remarkable proportion.

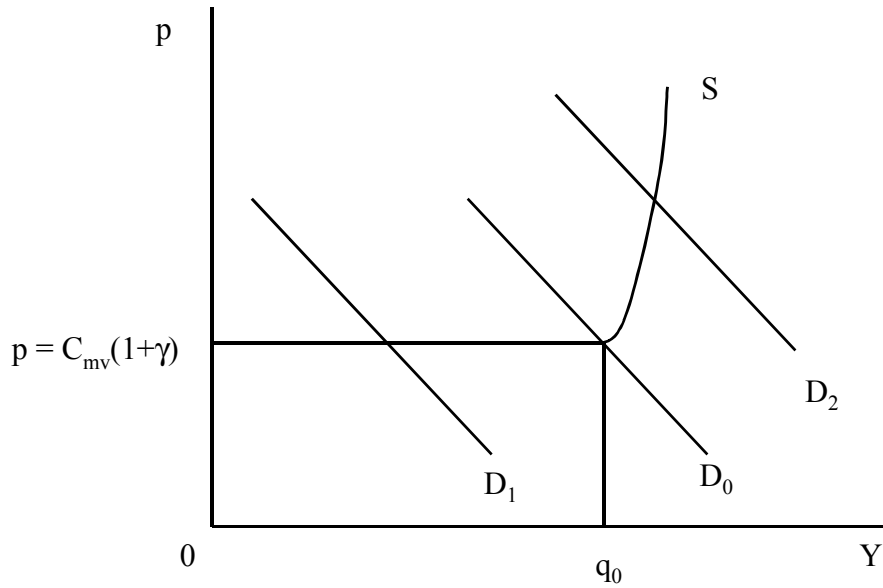


Figure 4

Therefore, for each  $q < q_0$  the price is  $p = CM_v (1+\gamma)$ , while for each  $q \geq q_0$  the price comes out to be higher and is determined by the height of the demand curve. Thus, if undertakers correctly estimate ( $D_0$ ) or overestimate demand ( $D_1$ ) with regard to its actual value, they can always achieve the programmed profit margin, even if, in the second case the profit amount will be lower. If they underestimate it ( $D_2$ ) with regard to its actual value, the consumer pressure could drive price up allowing the achievement of higher margins. In the long term, then, the plant will be sized in such a way that it can exactly satisfy expected demand.

#### 4. Some conclusions

The observed features of Post-Keynesian microeconomic theory can be brought to a single common matrix, that is the effort to provide an alternative pattern to orthodox theory.

The different elements of the pattern identified in the previous pages have in common the refusal of the conditions posited by neoclassical theory, according to which the market, once the flexibility of monetary values is assured, is able to render the interests of producers and consumers compatible.

The alternative assumptions formulated by Post-Keynesian theory describe a market where prices, set by the undertaker, coordinate the demand behaviour. From this derives that the firms have the power to fix the price, influencing in that way the distribution of national income.

Two considerations arise from this analysis. First, it is no more possible to think, as the orthodox theory does, that the equilibrium of the firm can be associated with conditions of maximum satisfaction of traders. Even though the competition between firms is stiffer, it is likely that the mark-up will be reduced or cancelled. But since also in case of pure competition the income cannot be distributed according to the principles of marginal productivity – since following the assumptions made on the production function, the marginal product of labour equals the average product and Euler's theorem no longer applies – it is necessary to derive alternative distribution rules. Post-Keynesian scholars conclude that the total output value is distributed according to the market power of parties.

Second, the potential points of equilibrium are many. In fact, it is possible that, in correspondence with a given value of monetary demand expected by the undertaker, different prices and quantities depending on the dimension of the programmed mark-up and on the plant size<sup>19</sup>.

All of this can be summed up in the statement that the economic system does not tend *by nature* to an ideal state of equilibrium, because operators are not all on the same level. The equilibrium position achieving a Post-Keynesian model arises from the market power owned by each part and from the capacity the market has to mitigate conflicts.

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<sup>19</sup> According to Don Patinkin – who considered by Post-Keynesians a neoclassic Keynesian – labour market imbalances and the liquidity trap can be the exclusive product of monetary illusion, that is, a peculiar money market rigidity. See Patinkin (1969).

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